

NEW COMBINATIONS IN DICHANTHELIUM (POACEAE)

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Hitchcock and Chase (1910) created the subgenus Dichanthe-
lium for a distinctive group of New World species of Panicum. The members of the subgenus were characterized as being caudex-forming perennials which die back to a rosette of short, broad leaves in winter. In spring the main culms bear terminal panicles of chasmogamous spikelets which according to Hitchcock and Chase, and Church (1927) were mostly infertile. In summer profuse branching and rebranching from main culm nodes often produces fascicles of reduced branches and numerous small panicles of cleistogamous spikelets which usually produce seeds.

A few other distinctive features of the subgenus Dichanthe-
lium were observed in subsequent years. Brown (1948), Bowden (1960), and others noted that most of the species are diploids ($n = 9$) in contrast to the high frequency of polyploidy in other groups of Panicum. Lelong (1965), Freckmann (1967), and Spellenberg (1975) indicated that most of the taxonomic problems in the large species complexes seem to be attributable to a combination of hybridization and autogamy rather than apomixis. It was also noted that the species of Dichantherium are more abundant in warm temperate areas, especially on the Coastal Plain, and were more active in the cooler seasons, especially the spring, generally beginning blooming two months earlier than species of other subgenera of Panicum.

More recent observations have strengthened the case for giving generic status to Dichantherium. Brown (1958) noted that one species of Dichantherium lacked the Kranz anatomy which occurs in most panicoid grasses. Hsu (1965) found that species of the subgenus Dichantherium, including species of the section Turfosa which he transferred to the subgenus, had a unique combination of features of the lemmatal epidermis, the style branches, the lodicules, and the ligules. Smith and Brown (1973), Bender and Smith (1973), and Brown and Smith (1975) examined more than half of the species of Dichantherium and found that all lacked Kranz anatomy and all had C-3 photosynthetic pathways rather than the C-4 pathway prevalent in panicoid grasses. Gould (1974) elevated Dichantherium to generic status. Clark and Gould (1975) provided further evidence for its status as a genus through a comparative study of palea epidermis of Dichantherium, Panicum, and Echinochloa.

Gould (1974) and Spellenberg (1975) provided new combinations for species occurring in Texas and the western U.S. I am completing a study of Dichanthelium in Wisconsin to be submitted for publication in the Transactions of the Wisconsin Academy of Sciences, Arts, and Letters. Although this study is based on all Wisconsin specimens at WIS, MIL, UWM, UWSP, UWO, UWIC, and MIN, specimens throughout the geographic range of the species treated, including type material, have been examined at US, MO, and ISC. Several new combinations are required. A more complete discussion of the evidence in support of the taxonomic decisions leading to these new combinations will be presented in the paper to be submitted to the Wisconsin Academy.

Dichanthelium perlongum (Nash) Freckmann, comb. nov.

Bas.: Panicum perlongum Nash, Bul. Torrey Bot. Club 26: 575. 1899.

Freckmann (1967), Voss (1972), and others have noted intergradation between Panicum depauperatum, P. linearifolium, and P. perlongum. Gould (1975) maintained the first two as separate species in Dichanthelium, but placed P. perlongum in synonymy under D. linearifolium. Only 25 specimens out of 395 specimens from Wisconsin appear to me to be intermediate between any pair of these three species. Only two of these specimens are intermediate between D. perlongum and D. linearifolium. These intermediate specimens have a pollen fertility of 47-49% (determined by shape and stainability in lactophenol - cottonblue) compared to 91-97% for typical D. linearifolium and 87-97% for typical D. perlongum. In Wisconsin D. perlongum produces chasmogamous spikelets about one week earlier than D. linearifolium when the two grow together, and appears to be primarily autogamous when the latter species begins its chasmogamous phase.

Dichanthelium wilcoxianum (Vasey) Freckmann, comb. nov.

Bas.: Panicum wilcoxianum Vasey, U. S. Dept. Agr., Div. Bot. Bul. 8: 32. 1889.

Circumstantial evidence and comparative morphology suggest that D. wilcoxianum is a derivative of hybridization between D. perlongum and D. villosissimum var. praecocius (Lelong, 1965; Freckmann, 1966). However, it is usually fertile with good seed set yielding essentially uniform progeny.

Dichanthelium boreale (Nash) Freckmann, comb. nov.

Bas.: Panicum boreale Nash, Bul. Torrey Bot. Club 22: 421. 1895.

This is a fairly well-marked species of the northern U.S. which rarely intergrades with D. lanuginosum var. lindheimeri.

Dichanthelium lanuginosum (Ell.) Gould var. lindheimeri (Nash) Freckmann, comb. nov.
Bas.: Panicum lanuginosum var. lindheimeri (Nash) Fernald, Rhodora 36: 77. 1934. P. lindheimeri Nash, Bul. Torrey Bot. Club 24: 196. 1897.

This taxon is in need of further study. It may encompass two or three elements including delicate, slender plants of wet meadows, fens, and shores; glabrous extremes of D. lanuginosum var. fasciculatum (Torr.) Spellenb.; and derivatives of hybridization between D. lanuginosum and either D. dichotomum (L.) Gould or D. boreale.

Dichanthelium villosissimum (Nash) Freckmann, comb. nov.
Bas.: Panicum villosissimum Nash, Bul. Torrey Bot. Club 23: 149. 1896.
Synonyms include D. lanuginosum var. villosissimum (Nash) Gould.

This is a species of the southern U.S., most common in dry, sandy, open woodlands.

Dichanthelium villosissimum (Nash) Freckmann var. praecocius (Hitchcock and Chase) Freckmann, comb. nov.
Bas.: Panicum lanuginosum Ell. var. praecocius (Hitchcock and Chase) Dore in MacNeil and Dore, Le Naturaliste Can. 103: 562. 1976. P. praecocius Hitchcock and Chase, Rhodora 8: 206. 1906.

Although some intergradation occurs between all pairs of taxa within the "lanuginosum" complex, it seems to me that intergradation between var. praecocius - a tall grass prairie taxon of the upper Midwest - and var. villosissimum - a taxon of southern dry woodlands - is more frequent and significant than the intergradation between either variety and the local variety of D. lanuginosum.

Dichanthelium columbianum (Scribner) Freckmann, comb. nov.
Bas.: Panicum columbianum Scribner, U.S. Dept. Agr., Div. Agrost. Bul. 7: 78, f. 60. 1897.
Synonyms include Panicum tsugetorum Nash.

In the upper Midwest this species intergrades fairly frequently with D. meridionale and rarely with D. commonsianum var. euchlamydeum.

Dichanthelium meridionale (Ashe) Freckmann, comb. nov.
Bas.: Panicum meridionale Ashe, Jour. Elisha Mitchel Sci. Soc. 15: 59. 1898.
Synonyms include Panicum albemarlense Ashe.

Many intermediate specimens, apparently including putative F_1 hybrids, backcrosses, and autogamous races, link this species with D. lanuginosum and D. columbianum. Nevertheless, the majority of specimens are highly fertile and occupy distinct habitats or niches.

Dichantherium commonsianum (Ashe) Freckmann, comb. nov.
Bas.: Panicum commonsianum Ashe, Jour. Elisha Mitchell Sci. Soc. 15: 55. 1898.

This is a fairly distinctive Coastal Plain species usually found on very sandy soils in open areas.

Dichantherium commonsianum (Ashe) Freckmann var. euchlamydeum (Shinners) Freckmann, comb. nov.
Bas.: Panicum commonsianum Ashe var. euchlamydeum (Shinners) Pohl, Amer. Midl. Nat. 38: 507. 1947. P. euchlamydeum Shinners, Amer. Midl. Nat. 32: 170. 1944.

Pohl (1947) suggested that this variety represented an inland extension of P. commonsianum which moved into the upper Midwest during the recession of Pleistocene glaciers. The two taxa intergrade in Pennsylvania. Intergradation between both varieties and D. columbianum occurs to a lesser extent from Michigan eastward.

Dichantherium leibergii (Vasey) Freckmann, comb. nov.
Bas.: Panicum leibergii (Vasey) Scribner, in Britt. and Brown, Illustr. Fl. 3: 497. 1898. P. scoparium var. leibergii Vasey, U.S. Dept. Agr., Div. Bot. Bul. 8: 32. 1889.

This is a characteristic species of the tall grass prairie region. It is a diploid (Brown, 1948) closely related to D. xanthophysum. Rarely it forms essentially sterile hybrids with other species of Dichantherium.

Dichantherium xanthophysum (Gray) Freckmann, comb. nov.
Bas.: Panicum xanthophysum Gray, Gram. et Cyp. 1: No. 28. 1834.

This species is closely related to D. leibergii, but is a tetraploid (Bowden, 1960). Its range generally lies north of D. leibergii. It apparently occasionally produces sterile hybrids with certain diploid species including D. leibergii.

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